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ABSTRACT

The 1971 B.Y. Morrison Memorial Lecture by Ian L. McHarg, noted landscape architect, planner, and lecturer, is presented in this pamphlet. His expose is two-fold. "Man is an epidemic, multiplying at a superexponential rate, destroying the environment upon which he depends, and threatening his own extinction. He treats the world as a storehouse existing for his delectation; he plunders, rapes, poisons, and kills this living system, the biosphere, in ignorance of its workings and its fundamental value." In contrast, "survival of man is contingent upon categorical rejection of this cultural inferiority complex that is the Western view, and its replacement with the ecological view--man in nature. This reveals the ways of the working world and shows our ignorant interventions as self-mutilation, leading to suicide, genocide, biocide." To determine if man can survive, he concludes with the question, "Are you healthy? If you find any system which is healthy, you have found a system which has been able to find a propitious environment, adapt the environment, and adapt itself . . . The battle is really for survival first, and fulfillment next." (Author/BL)

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Man: Planetary Disease

The 1971 B. Y. Morrison Memorial Lecture

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AGRICULTURAL RESEARCH SERVICE · U.S. DEPARTMENT OF AGRICULTURE

The B.Y. Morrison Memorial Lecture was established by the Agricultural Research Service of the United States Department of Agriculture to recognize and encourage outstanding accomplishments in the science and practice of ornamental horticulture . . . to encourage its wider application to improve the quality of living . . . and to stress the urgency of preserving and enhancing man's environment.

B.Y. Morrison (1891-1966) was a many-faceted man—a scientist, landscape architect, administrator, plant explorer, author, and lecturer. A pioneer in ornamental horticulture, he was the first Director of the National Arboretum, today one of the world's great botanic research and education centers. He gave the American public dozens of new ornamental plants, including the well-known Glenn Dale azaleas. He did much to advance the science of botany in the United States.

Morrison's plant exploration trips to the Orient, Europe, and Latin America made him a nationally known authority on foreign plants. He was one of the first Department officials to encourage introduction of ornamentals. His popular publications were among the first to promote plants to enhance the beauty of the land.

The 1971 B. Y. Morrison Memorial Lecture

Presented in cooperation with
the Wildlife Management Institute
at the North American Wildlife
and Natural Resources Conference
Portland, Oregon
March 10, 1971

Man: Planetary Disease

by Ian L. McHarg
University of Pennsylvania
Philadelphia

My propositions are simple.

You have no assurance of a future.

The views of man and nature which permeate the entire Western culture are the reason.

Our view of man and nature does not correspond to reality, has no survival value—indeed, it is the best guarantee of the extinction of man.

Man is an epidemic, multiplying at a super-exponential rate, destroying the environment upon which he depends, and threatening his own extinction.

He treats the world as a storehouse existing for his delectation; he plunders, rapes, poisons, and kills this living system, the biosphere, in ignorance of its workings and its fundamental value.

Survival of man is contingent upon categorical rejection of this cultural inferiority complex that is the Western view, and its replacement with the ecological view—man in nature. This reveals the ways of the working world and shows our ignorant interventions as self-mutilation, leading to suicide, genocide, biocide.

Is Man But a Planetary Disease?

The first story I tell is of an image conceived by Loren Eiseley, who is a great cultural anthropologist at the University of Pennsylvania—a large, wise, round, magnificent man who wrote *Darwin's Century* and *The Immense Journey*. Seven or 8 years ago he conceived that a man in space might be able to look from that distant vantage at the earth, and this hypothetical man saw the earth—this small rotating orb, our home—and he perceived that the earth was green: green from the maritime algae of the oceans, green from the verdure of the land. He perceived that the earth was indeed a green celestial fruit, this green epidermis encircling the globe, this interacting biosphere which encompasses all life. He looked more closely and saw a number of blemishes, brown, black, and gray; and from these extended dynamic tentacles. And he realized that the pathological tissue in the world's life-epidermis was indeed the works and cities of Man; and he asked, "Is Man but a planetary disease?"

I think the answer to that is that some men are, and some men are not; and it is important to look deeply into our hearts and into our institutions, to decide who is and who is not.

The real battle in the world is not between communists and capitalists, black and white, rich and poor, green and

5

purple, heliotrope or gamboge. The real fundamental division in the world is between these people who are not planetary diseases and those who are—necrotic pathological tissue walking around pretending to be men. They are pathogens, no matter whether or not they get up in the morning and wash and shave, put deodorant under their arms, and kiss their wives before going to their work. They are by their acts those agents who are threatening our very survival and making impossible any prospect of fulfillment. There are people who are planetary diseases, and we've got to decide who are and who are not.

It is important to recognize that we are engaged in a war, and this war is much more important than any ostensible war or any ridiculous kabuki dances of violence which are represented as wars to us. These are not wars—these are irrelevancies. The only real war is with these people who, by their acts, have been inflicting lesions upon the world life body by producing a rain of death, by inhibiting this green, gorgeous biosphere, this culmination of 6 billion years of time and 2½ billion years of life, threatening the possibility of our survival and inhibiting any possibility of our fulfillment.

We are not interested in protecting birds or bees or flowers—we are concerned with the survival of Man. Conservation has got nothing to do with cardinals or azaleas—it has to do with survival. This is a battleground! Think then, upon those people who have inflicted lesions upon the world life body—they have laid about with cudgels and with gouges and with axes, they have decimated life and extirpated great realms of life, have inflicted enormous wounds upon this continuous green epidermis. That is their work, their act, and this is their view

of themselves and their accomplishments. These are, by definition, planetary diseases.

If there were such a thing as a planetary doctor who could look upon the earth and see that there was one creature who was multiplying at an exponential rate and who was not only extirpating great realms of life upon which it was dependent, but was inhibiting its own chances of survival, he would say, "There is a planetary plague, an epidemic." Man and the acts of man would be seen as impinging upon this world life body, rather like an epidemic of so-called locusts—except that these insects may have a 17-year cycle, whereas man has no cyclicity; his depredations are absolutely continuous and are accelerating.

Planetary Diseases Institutionalized

Some of the things I say may not be palatable, but I do not say them to please you, only to share my obsession with you. It is important to recognize that there are a lot of planetary diseases that have been institutionalized, that we have made instruments which are competent only in destruction and whose only works are destruction. In my view, the military is almost entirely a planetary disease from top to bottom. Certainly the creators of napalm, defoliation, ICBM's, biochemical warfare—all these people are in fact not men, they are absolute pathogens, worse than any kind of plague you can imagine. The bubonic plague is a mere dandruff in comparison!

These people you cannot treat as though they were human beings—their wives should have nothing to do with them. They can't be allowed to represent themselves as people and be recognized by friends because they are in

1 7

fact planetary diseases and agents of destruction and retrogression. It's as if the whole of evolution is working toward one objective, and these putrescent things are in fact retarding it.

We must recognize that there are institutions that have encapsulated planetary diseases—much of the military, all of these horrifying people who are concerned with biological warfare. . . . Can you imagine a man coming home at night and saying to his wife, "Darling, I have just invented a new anthrax which can eliminate every bovine animal in the world instantaneously," and his wife embraces him and says, "Oh, darling, what does it mean for us?" And he says, "Well, I get $10,500 now, and I'm going to get $11,300 and an extra day's vacation—why don't you buy yourself a dress?" . . .

These people must be identified as putrescent, loathsome, almost beyond salvation.

And then one makes one's way down to the major industrial corporations who so cynically void their excrement into our environment, air, and water—these great, noble corporations whose products are household words, but who have not been toilet trained! They are filthy! What do we say to children who dump their excrement in public places? Why should we say anything different to these great corporations?

I went on the Mike Douglas Show once, and at the end, Mike Douglas asked for questions from the audience, and some lady said, "What do we do about pollution, Mr. McHarg?" I said, "Well, the first thing to do is to identify these people who are filthy . . . Call them up, all these dirty polluters, whose excrement you can see, tell them they are dirty, filthy, and should be toilet trained."

You cannot allow business as usual to proceed, because

there is a planetary disease at work. That planetary disease can be identified. It must be stopped if we are to survive. Survival is the first quest, and these people are hell-bent on insuring our extinction. Now, why should we have produced a culture in which this kind of thing seems so inevitable? Why should so many people believe it is their God-given role?

"Next Time, No Brains"

I have a nightmare about this. Some unknown, white-coated, miserable, sepulchral warrior decides that the resolution of some temporary human squabble must be done by a great hail of atomic weapons across the world. We don't know who this man is or what the circumstances are, but this arrogant, witless man is prepared to sacrifice 2½ billion years of evolution, and 1 million years of human evolution, 10,000 years of human cultural evolution, to resolve some temporary, irrelevant human squabble—and in my nightmare, he does. So there is a rain of death and all life is extirpated—except that there persists a small colony of algae, these tiny unicellular plants, the origins of us all. And these algae perceive that all life is extirpated save they, and that 2½ billion years of evolution must ensue in order to recover only yesterday. They come to the immediate, spontaneous conclusion, "Next time, NO BRAINS!"

Brains are a recent phenomenon; brains justify the view of man that everything from the neck up is all right because that's where the brain lives, and that everything from the neck down is scented, smelly, glandular, and basically sinful. The job of the brain is to stabilize the sinful proclivities of the area below the neck. The con-

9

ception of this dichotomy is an illusion, but it is very deep in our culture. It is an illusion that is important because it motivates our attitude toward nature, because we have taken this same dichotomy and extended it to the relation between man and nature. We have said that man is brain and the area below is nature. We assume that brain will conquer the carnal man, and man-brain will conquer carnal nature. Thus the despoliation by man—which is really his only work—becomes comprehensible.

The Western View of Man as Divine and Dominant

If any of you has the slightest kind of theological bent, what you say in passing is that the basic attitude of man and nature is explicit in Genesis, central to Judaism, absorbed and changed into Christianity. It says in the first chapter of Genesis that man is exclusively divine—which means that everything else is rubbish—man is made in the image of God. Man has pre-empted the image of God. The second line says man is given dominion over life and nonlife. Dominion is not a negotiating term. You cannot love anything, as St. Francis did, and have dominion over it. Dominion means that the other thing lies down before you. If there is any doubt about the relation of man and nature, the third line clinches it when it says, "Man is licensed to subjugate the earth."

If you want to understand the Western view of man and nature, in the Judaic-Christian-humanist tradition, all you have to know is these three lines: Man is exclusively divine and everything else is rubbish; Man is given dominion over life and nonlife; and Man is enjoined to subdue the earth. Understanding that text, look retrospectively back to

the despoliation of all the land which has been accomplished by man, particularly Western man, and you will recognize that the men who believe this to be so can only accomplish destruction.

I say—with better men than I . . . Paul Tillich representing Protestantism, Gustav Weigel speaking for Catholicism, Abram Heschel speaking for Judaism—that this is an allegory, that it must never be accepted as literally true. It not only has no survival value, but it is absolutely the best guarantee of extinction. If you want to find a moral text to motivate that man who will press the button and produce a hail of atomic weapons which will extirpate all men and all life, that is that text . . . He is forever forbidden any possibility of any creative role.

I have spent 10 years talking to the best theologians on this subject. This is not an anti-Jewish, anti-Christian, anti-Catholic, anti-Protestant view. My view has been espoused by every important theologian I know—Martin Buber, Schweitzer, Karl Barth, the lot.

This is, of course, not a literal text. We have absorbed through our mothers' milk, in kindergarten tales, in fairy stories, books, and magazines, that the world exists for human delectation; the world is a pyramid erected to support man at its pinnacle; reality exists only because man can perceive it; the world is a stage to allow the human drama to be played; the world is a storehouse for our delectation, and we in fact have dominion, we are exclusively divine, and we shall subjugate it. It is an absolutely horrifying text, and it is important to recognize not only that it has no survival value, but that if many people believe this, we cannot survive. It simply doesn't correspond to reality in any way; it is not a working text. It absolutely has extinction value.

The World, a Single Interacting Biosphere

We have got to put it together again; there has got to be a better view. This view that we have absorbed with our mothers' milk is absolutely calamitous and in every single way is wrong. There is no bit of information reposing in any of the sciences that is in conformity with this view of man. This conception has only one verb in the relation of man to nature, and that is "conquer." That is why it is no surprise that we talk about conquering the West, conquering the land, conquering the seas, conquering Mount Everest. It is always "conquest," and this is our only possible role as long as we have this view. We have got to junk it because there is no place for conquest.

If you think of the world as a single interacting biosphere which includes not only ourselves but all of our antecedents, by virtue of living you see you are united to all life. Not metaphorically—really—you only got a little bit of life from your father and your mother, and they only got a little life from their father and mother, and back we go to pre-*Homo sapiens* and then to *Australopithecus* and then to our primate precursors, back through this great evolutionary table—life given only by life, all life connected to all life, until finally you are right back to this primeval organism wherever it was. So this other life is not something else, it is an extension of ourselves. All things that live come from the same origin. We are united by all forms of life, so the conception of our being apart from it is an illusion—there is no apartness, it is all one thing, all derived from common origins.

Not only is all life descended from a common source,

but all life is descended from matter. As all matter is descended from the original hydrogen, we are then united to the original hydrogen. This is even more hair-raising when you consider that in the original atom somewhere in the universe was the possibility of the evolution of all matter and all life—this was intrinsic in that first atom of hydrogen. The unity of all life is a most important proposition—all life is unified by virtue of the transmission of life by life, which is the only way it can be transmitted —so, to destroy something else is self-mutilation. There is no other conception except one biosphere on which the destruction of any part is self-mutilation. It is us, we are it, it is one thing, we are unity.

"That's the Way the World Works!"

What is the view that can begin to put this thing together? For me, the beginning of putting it together started about 7 or 8 years ago when I was employed by Glenn L. Martin. I met a scientist who was trying to send a man to the moon with the least possible luggage. This man's experiment consisted of a plywood "capsule" in the lid of which was a fluorescent tube simulating sunlight; but electricity is only fossil sunlight, so it's not a very distant simulation. Inside this was some air, some water, algae living in the water, and a man. In the water there were some bacteria as well. The system works as follows. The man breathes some air, he consumes oxygen, and breathes out carbon dioxide. The algae breathe in carbon dioxide and breathe out oxygen, which the man breathes. So there is a closed cycle of oxygen-carbon dioxide.

The man gets thirsty, he drinks some water. He urinates, the urine goes into the water solution in which the algae

live. The algae transpire, the transpirations are collected; the man drinks the condensation. So there is a closed cycle of water. The man gets hungry, he eats some algae; he defecates. The excrement goes into the water solution in which the bacteria and algae live. The bacteria break down the excrement into nutrients which are consumed by the algae, which grow, which the man eats. In this experiment, then, there is only one input, which is sunlight; there is only one output, which is heat. There is a closed cycle of oxygen and carbon dioxide, of water, of food. And the question is, "Is that the way the world works?"

And the answer is, "YOU'RE DAMN RIGHT, THAT'S THE WAY THE WORLD WORKS." And everybody who knows this is the way the world works knows enough to insure survival. Anybody who doesn't know this is the way the world works—no matter what he knows—knows *nothing*!

So planetary diseases are people who either do not know this or, while knowing it, act contrary to it. Those people who are husbandmen, in the Biblical sense, or stewards, and who believe that there is a deferential, creative role for man, know it, whether they have been in the capsule metaphorically or intellectually. They understand it intuitively. Man is a plant parasite; there is no other thing for him to be. The plants don't need him, but they can use his waste, so man is a plant parasite.

Fireworks at Canaveral—Ecology Encapsulated

I would love to use that experiment for all sorts of purposes. One would be to get all the putrescent men, all the pathological tissue men, all the arch-destroyer men,

and make thousands of these capsules, each with water and algae and bacteria equal in biomass to the man. Get all of these people into these capsules and have what I'd call Fireworks at Canaveral—we take all the arch-destroyers, each one in his rocket capsule, and send them off on great, long, helical, indeterminate trips into space! Off they go, and the marvel about this is to get rid of them from earth. If the earth knew it, it would say, "Oh, what a relief! These arch-destroyers are gone, the chance of survival will be extended; they can accomplish no destruction while they are in space."

I would not feel badly if we lost any of them. This is a real war, you see—we're not kidding around, we're not protecting dogwood, we're talking about survival!

Just imagine each of these arrogant, witless men in his little capsule. We'll assume that after 3 or 4 weeks in a dark, empty space, one of them would say to the algae, "I'm divine, you know, I have dominion over you, I am licensed to subjugate you." The little algae continue to perform their work, and this plant parasite's atrophied brain begins to work. He realizes that, given enough time, in the recirculating system all that had been the algae would be man, everything that had been man would be algae, and at a certain point there would be a total exchange. If he had any theological turn of mind, this man would realize that a halo on the algae was no more or less ridiculous than the halo on the man—if there is any divinity, the divinity is pervasive. It would cross his calcified mind that there is no place for dominion in this, that here was interdependence to a degree which exceeds the dreams of marriage, that the algae were closer to that man than wife or child could ever be.

I would extend from this mind that what was true in

the capsule was true in the world at large, and there would be some other lessons. Man would realize that into the capsule he could not introduce any radioactivity—the radioactivity would cause a mutation, and mutation was the last thing that he wanted. His survival was contingent on there not being a mutation; but that is true in the world at large—any increase in radioactivity increases the amount of mutations, and most mutations are deleterious. Who wants deformities? Who wants leukemia?

And he would also understand that in that capsule he couldn't tolerate any DDT or any poison at all because this is a recirculating system and that stuff was going to get into his fatty tissue right fast. He would realize that this is true in the world, too—you can't sweep death under the carpet. He would understand that you can't lose any of the nutrients in the system—you can't blow away 10 percent of the topsoil into the river every year forever.

And so through his calcified, witless mind would enter these primitive lessons which ancient people knew, and we in our high civilization don't know, and he would begin to learn. And at Houston they would be listening to all these destroyers whistling about in space, listening for their conversion. The conversion would take many forms, but it would have these components.

The first would be that the man would address the world in some deferential, understanding way. He would say to matter—to all the elements, "Matter, of this are the universe, the world, and life made." And he would address the ocean and say, "Ancient home!" He would address the sun and say, "Shine, that we may live." And he would address the clouds and rain and sea, "Nourish us from the sea—we erstwhile sea creatures who have escaped from the ancient sea by only the length of a cell."

He would address all plants and say, "Plants, live, grow, breathe that we may breathe, eat and live." And he would address the atmosphere, this sum of ancient breaths—that's what the atmosphere is made of, the exhalations of plants over 2½ billion years of life—and say, "Nourish and sustain us." He would talk to these little micro-organisms that are in the mud and in the soil and in life, and say, "Decomposers, reconstitute the wastes of life in life; reconstitute the substance of life after death in order that life can endure."

And when he had said these things with understanding, we would say to him, "Come on home! Enter into the warming spiraling arms of the earth's gravity, enter this green celestial sphere that is our home, the home of our origins and that place where we will accomplish our destiny. Exercise now your creative will, because you have learned that deference born of understanding."

Evolution a Creative Process, Independent of Man

I can't now recount to you the model of the operation of the biophysical universe which reposes in the natural sciences, but there are one or two things I'd like to say about it. Nobody writes about it, you see, because this understanding exists only in a few ecologists, probably 200 in the United States. Two hundred million people who don't know enough to insure our survival, and probably only about 200 ecologists who know that which everybody should know!

The first proposition in the biophysical scientist's model of the world is that the world—that is, all matter and all

life processes—is creative and has been since the beginning. Creativity has nothing to do with man.

There is something called creativity, and it isn't metaphorical—it is absolutely literal. That is, the evolution of matter from the primeval hydrogen, helium, lithium—every step in the table of the elements—was a creative act involving enormous quantities of energy. For instance, to get the heaviest elements required the explosion of a supernova—to drive these elements up the periodic table, to get those heavy elements which are indispensable for evolution and essential for life. Every step in the evolution of compounds was a creative act.

The most important single creative act in all of evolution, I think, was the evolution of the plant. We are now talking about basic creativity—what the world has been doing since the beginning of the world. This means that matter and energy have been employed to raise matter and energy to higher levels of order. This has been directional, or at least it seems to be so as we look back over 6 billion years of time. So the world has been a creative process since the outset, engaging all matter and all life. And the plant is a particularly marvelous point in this evolution of creativity.

Think of a time when all of the sunlight that fell upon the earth equalled the heat that the earth lost. That went on until the advent of the plant. And the evolution of the plant appeared with this marvelous gift of photosynthesis. The plant, then, in the presence of carbon dioxide and water, can take sunlight and transmute it into "stuff," into glucose. So here we have a little dialogue between the plant and the sun.

The plant says, "Sun, do you mind if I have some of your energy?" The sun says, "Sure, but you know the

second law of thermodynamics—you've got to give it back." And the plant says, "I don't mind, you can have it back after I have used it." So in the presence of carbon dioxide and water, the plant held its little ol' protoplast up to the sun, transmuted the sunlight into the essential stuff of the cell, kept losing energy (as you are and I am now) ; but the energy is always replaced. Meanwhile the cells are replicating, the plant is evolving—shifting sidewards—more and more and more plants encapsulating more and more sunlight into themselves, altering and evolving in this marvelous way . . . all of this creativity, all of the evolution of all organisms in all time is based upon the capacity of the chloroplast in the plant to temporarily entrap sunlight in its path to degradation. That is absolute, rockbottom, fundamental creativity, without which there can be nothing.

So any time you see a plant—I don't care whether or not you think it is beautiful—just know that this is engaged in the most profound creativity in the world, without which there would be no world; that all life is dependent upon the plant, all the orbiting which is accomplished by all life in all time is dependent upon the capacity of the plant to temporarily transmute and encapsulate sunlight into its being—only temporarily, because the energy will be lost. But the energy is replaced—meanwhile, more of this energy is encapsulated into this evolving thing.

This is one of the most fundamental things in the whole world. To see that in over 2½ billion years of life in plants they have been evolving, encapsulating more material, raising it to higher levels of order—this is creativity. So the conception of the world as being engaged in a creative process, independent of man, is a terribly important proposition. The world is engaged in some yearning

19

and fulfillment—to which man must subscribe, there must be a role for man—but it's proceeding independent of him. It did without him for 2½ billion years, and it can proceed without him. If he extirpates man, evolution will move back to that last step that remains, and the process will proceed again, presumably without brains.

But there must then be a creative role for man, and that we have not found. In thermodynamic terms, we have only and always, in the Western tradition, been destructive. We have not yet found a human creative role. We have behaved like vandals despoiling a storehouse, on this great continent of North America—this great storehouse 6 billion years in the making, the best that nature could do with 2½ billion years and the whole genetic pool, and these witless men, knowing nothing, came over to it and treated it like vandals raiding a storehouse, like drunken sailors on a spree, destroying all these resources, blowing them up the chimney.

The conception of the world as a creative process, I think, is a terribly important one. There's lots more to this thing, and if you want to read it and can get through my turgid prose, read my book, *Design with Nature*.

Apperception, Man's Claim to a Creative Role

There are one or two more points which are also terribly important. One is, there can be no creativity in organisms or in man without an understanding, and for man the important understanding is the way the world works, the knowledge of the capsule, and more.

If the sunlight falls upon me and also upon a stone beside me, the sunlight (which is just energy, whether it

hits me or the stone) that falls upon the rock heats the rock and the rock expands. The energy that falls upon me may or may not cause me to expand, too; but I see the sunlight not only as energy but as information. The sunlight tells me I am getting warm, and I then take off my tie, take off my jacket, look for a beer, and want to go for a swim. What has happened is not that the energy has changed, whether it falls upon me or upon the rock; but I have transmuted it from energy into information, from information into meaning. Presumably, the rock is not able to do that.

Now, that is apperception. That is the capacity of an organism—whether it is a subcellular process, an organism, or an ecosystem—to transmute energy into information and thence into meaning. And this is man's claim to a creative role—his capacity, his marvelous apperceptive device, his capacity to perceive the world and to reconstitute it into information and thence to meaning. So that is his opportunity to become the husbandman, the steward of the biosphere, helping to manage this work—which is contingent upon the development of his apperception. That is, he's got to know the way the world works, and we have just observed that his view of the way the world works is a fallacy, an illusion, and has no survival value whatsoever.

Symbiosis, Specialization, and the Golden Rule

There is one other thing which has a tremendous moral implication. Creativity depends probably most of all on something scientists call symbiosis. Symbiosis simply means a cooperative process—if you do this for me, I'll do that

for you. Now, each of us is an integrated human organism, more or less. We consist of 30 billion billion cells. These are replicated at the rate of about 10 billion cells a day. All of them come from a single fertilized egg. That egg begins to divide, and the earliest divisions are unspecialized cells that are almost indistinguishable from our ancient ancestors, those little unicellular animals that swam in the ocean. So our replication from a single cell to a whole organism with 30 billion billion cells is really a mirror of all evolution.

Now think of what happens—the first cell is an unspecialized cell, almost identical to those ancestors of ours which are now, 2½ billion years later, swimming in ancient seas—protozoa. As the cells evolve, they assume specialist roles—white blood cells, red blood cells, tissues, organs, and then a whole organism.

Remember that every time there is a specialization in a cell, it is conceding some part of its immortality—because the original ancestors were immortal. The edge of life moves, but the thing is immortal. But, when it's in us and changing from an unspecialized to a specialized cell, it is conceding some part of its immortality, some part of its freedom, its autonomy, toward a cooperative arrangement in which it says, "I'll be a tissue," "I'll be a pancreas if you'll be a heart." Every one of these specializations involves a concession of autonomy, of immortality, of freedom, toward a cooperative enterprise which is the integrated organism or process—subcellular, tissue, organ, organism, or an organism in an ecosystem.

In every case the thing we are considering concedes some part of its immortality (That's a theological term!) toward the end of a cooperative mechanism that is believed to have survival or fulfillment value. And that is altruism.

Altruism is something that philosophers and theologians are supposed to talk about. That's what the Golden Rule is. It's important to recognize that the Golden Rule is fundamental to life. It exists as subcellular processes, and it's at least 2½ billion years old. The whole operation of the working world and the whole of creativity in the working world depend on this symbiosis. Because the cooperative mechanism is essential for the plant to accomplish its creativity in photosynthesis. This cooperation is necessary for the apperception that exists in the plant and all other organisms. So, altruism and the Golden Rule are fundamental to life and fundamental to survival and fundamental to creation. And this, of course, is antithetical to the concepts of dominion, subjugation, and exclusive divinity.

Can you conceive of any division within yourself in which some cells are divine and some cells are not divine? That some cells have dominion over others? That some cells have any possibility of subjugation? None. And so, you simply have to observe the conception of the cells within the organ, the organs within the organism, the organisms in the ecosystem, the ecosystems in the biosphere—and you learn that all life is engaged in a cooperative venture, which has been shared from the beginning and which is a common yearning now, and which is the basis for some kind of future.

Now, this is a metaphysical view to which we must subscribe, because this seems to be the way of the world and the yearning of the world.

23

Consciousness Doesn't Mean We Have To Be a Planetary Disease

We now believe that creativity is real and true, that the world is a creative process engaging all physical matter, all life systems, and that it has been so since the beginning. The world is a great yearning, as if everything had closed its eyes and was dreaming of some unfulfillable process which has taken many courses—in atoms, in compounds, in unicellular organisms, in multicelled organisms, and in all creatures in all times. It is a creative process, and we must find within this our creative role. Just because we walk erect, have binocular vision and opposing thumbs, and have consciousness doesn't mean that we have to be a planetary disease.

I think perhaps people in the East, or simple primitive people who behave as if unconscious, like Pueblo Indians—the great people who occupied *this* land for 10,000 years and left it as good as they found it (Who could say that today?)—only simple people were able to act creatively in the biosphere. When consciousness and sophistication intervened, then came destruction. But Oriental people and primitive people have not been so destructive—only Western, Judaic, Christian, humanist Man!

This creative study has some other attributes which are worth perceiving. The creativity consists of employing matter and energy to raise matter and energy to higher levels. An example: Let's consider a beautiful forest with plants and animals and micro-organisms. Now, if we ask a chemist to inventory the forest, he'll identify it as 99 percent-plus of organisms consisting of hydrogen, nitrogen, carbon, and oxygen, with 1 percent consisting of micro-nutrients and macronutrients. That's all it is, you see.

But then we have a forest fire. The chemist goes in there again and identifies all the stuff that's left, and we've got an inventory of the same oxygen, hydrogen, carbon, and nitrogen. In the fire we've lost some carbon dioxide and some water—that's all. But, we say, "Gee, that's not what it looked like!" The chemist says, "It's the same stuff, but over evolutionary time it had been raised to higher levels of order."

It takes work and energy to go from algae to fungi to liverworts to mosses to ferns—every step requires energy in a cooperative mechanism. The alga says to the fungus, "Look, fungus, you depend on me." And the fungus says, "That's right." The alga says, "You seem to be pretty good at anchoring, and I could do with some anchoring." The fungus says, "All right, I'll feed on you and you anchor on me." So, the alga and the fungus unite and become a lichen. That takes energy, work, and apperception over long periods of time.

So, the forest consists of the same matter as remains after a forest fire, but it has been raised to higher levels of order. Evolution has accomplished this, taking the same stuff which has been around the world since the beginning —the only thing that has been added is sunlight—and has raised it to higher and higher levels.

"Simple to Complex," the Test of Progress

We know that this process is a movement, not only engaging basic creativity, apperception, and symbiosis, but having a movement. It has always gone from greater to lesser randomness. To begin with, the universe was just a mess of rubbish. Later some observer would have said,

"Look, this rubbish seems to be coalescing." And, a little later, "I think some of this planetary rubbish has coalesced enough to give it a name. Let's call it Earth!" So, it moved from greater to lesser randomness; it started off as random gases which became less random and became air.

All of the movements—whether of atoms or compounds or organisms—moved from greater to lesser randomness. They have also moved from simple to complex, uniform to diverse, unstable to stable, low to higher number of species, low to high number of cooperative mechanisms. That is the way the world works, and these are the attributes of creativity.

If you find any institution which is going from complex to simple, it's going backwards, it's uncreative. If you see engineers moving into a complex, natural environment and building a dam, it's reversing and going from complex to simple, going backwards. If you see a great settled area in which there is an enormous diversity of people living symbiotically and in some sort of harmony—and all this is eliminated in the name of urban renewal and up come "suitcase architecture" and uniform WASP-rich—this in fact is retrogressing, going backwards from complex to simple!

This is a marvelous model which you can use to examine any kind of system at any level at all.

Fitness and Survival, Evolutionary Theory

There are two terms which have enormous utility and are not used much in the English language, but should be. The critical word is something called "fitness," and it has two meanings derived from two different men. One is

Charles Darwin. Darwin said, "The surviving organism is fit for the environment"; that is, only the fit organism survives, the nonfit species does not. The center of the whole evolutionary theory is that the surviving organism is fit for the environment.

Another man named Lawrence J. Henderson had another, more important proposition. Henderson said, "The real world with all its environmental variability is the fittest possible abode for life—for every form of life that has existed, does exist, or will exist."

So, if you put the two of them together, you find there is such a thing as the most fit environment for every organism, for every human being, every family, every institution, every bird, every plant, every micro-organism. The organism that is fit for the environment survives, the organism that isn't fit, doesn't. That's what it's all about!

Survival is the first test. If you survive today, you can survive tomorrow, and you might even argue about the next day. If you don't survive today, no argument about tomorrow! That's what nature is all about—survival and fulfillment. There's no fulfillment without survival, so let's argue about survival now and we might stay around to talk about fulfillment later.

Fitness! There's the conception of the most fit environment and the conception of the surviving organisms fitting the environment. We know that in evolution there is a tendency for every organism to try to find the fittest environment, and the necessity to adapt that environment. Environment changes, you see, all the time. The environment, remember, includes not only you, but all other organisms and physical processes, too. They are changing, the environment is changing, and so you have got to change.

So, there is a requirement, not only to find the fittest environment, but also to adapt the environment and to adapt yourself in order to accomplish a "fitting." And, if you don't, there's something called a misfit. So we have two things—one a fitting, a creative fitting, and a nonfitting which is in fact a misfit. And the fitting is in fact dynamically, literally creative. Like the forest fire example, it's moving from ashes up to a forest, it's literally creative; and the failure to do this thing is literally destructive. The surviving organisms in a forest have in fact accomplished a creative fitting; the reduction in a fire is in fact destructive.

Misfitting is in fact reductive. That's important, because we are engaged in this whether we like it or not. We are engaged in adaptation for survival at every level—cells in you, tissues in you, organs in you, you in a community, you in an ecosystem, all ecosystems in a biosphere—all are engaged in trying to find a creative fit.

The terrible thing is that all of this is known to only a handful of natural scientists. Every school child should learn it. We could make these "capsules" to send the generals off into space, but we should also make great, glorious capsules for children—enormous, wonderful greenhouses with plants and micro-organisms and mussels and snails, sunfish and bass, butterflies, and everything gorgeous as a recirculating system—and we should allow little children to come in and live in it and eat from it, and see their wastes reconstituted. They should live in it long enough to see that this is the system within which they live, and to love it and exult in it and know it. If only we could do that. . . .That this is known to so few people is horrendous!

Conclusion: Have You Survived? Are You Healthy?

I will now come to my—hopefully—triumphant conclusion. Isn't there a simple way in which we can see the whole thing at a glance? Of course there is! If you want to look back at this whole business of evolution, ask the creatures that have been around since the beginning: "How have you been doing? Have you been able to find a fit environment? Have you been a success, in evolutionary terms?" So you look back 2½ billion years at the algae, protozoa, fungi, mosses, and so on, and you speak to them (because they are still around) and say, "Have you been a success in evolutionary terms?"

They will say, "Friend, we have been here since the beginning. Some of our descendants are entertaining novelties; they may have augmented us but they have not superseded us. We are still doing 99.9999 percent of the world's work." So, you say to them, "Thank you, you *have* been an evolutionary success."

But on the other side, some didn't make it. They were not able to find a propitious environment, to adapt the environment and themselves. They accomplished a reductive misfit, and they were extinguished.

But you say, "Two and a half billion years is too far back." So I say, "Let's go back a million years. This includes man." So we look back a million years and ask the same question: "Have those of you who have been around for a million years been able to find a propitious environment, to adapt the environment, to adapt yourself? Have you survived?" Man and other creatures who have been around a million years would say, "Yes, we've survived." So this would be evidence that they have indeed

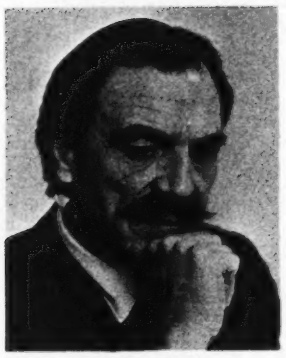
been able to find a propitious environment, and adapt themselves. But the passenger pigeon and *Tyrannosaurus rex* have not.

Can you bring this down to a nearer time? Sure, we can ask the same questions on the scale of a day, a week, a month, a decade. The question for a decade is exactly the same as the one for a million years (which was "survival") or a billion years (which would be "evolutionary success"). That question would be, "Are you healthy?" That's all—physical, social, mental health in human society, and physiological health in ecosystems. If you find any system which is healthy, you have found a system which has been able to find a propitious environment, adapt the environment, and adapt itself.

Think of America 10,000 years ago, when the first man made his way across the Bering Strait. The continent had been 6 billion years in the making—2½ billion years of life—and had been able to exercise, all of this time, all of the world's genetic pool in order to accomplish a creative fitting. When that man first came to this land, he found that here was the best that nature could do in terms of creative fitting. Think of that time, now, and think of *us*, now, if it were possible for us to say, "How can we intervene in this wonderful biosphere which encapsulates all the dreams of the origins of matter, all the dreams of the origins of life itself and all of its offerings? And we are a part of that dream, presumably, because we have come from it."

What is now the creative role for man? The countryside has been devastated, but it is still rich and beautiful. We still have opportunities for fulfillment beyond our dreams. America is the crucible for the whole world. If America wins, the world wins; if America loses, the world loses. The battle is really for survival first, and fulfillment next.

This is our concern. I commend it to you!



Ian L. McHarg, the 1971 B. Y. Morrison Memorial Lecturer, is one of this country's most entertaining and stimulating speakers on environmental abuses.

As teacher, practicing landscape architect, planner, writer, and lecturer, he is in the vanguard of ecological planning in the United States. He is founder and Chairman of the graduate Department of Landscape Architecture and Regional Planning at the University of Pennsylvania.

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A member of the White House Conference on Children and Youth, Mr. McHarg was named Distinguished Science Lecturer by the Brookhaven National Laboratory, and delivered the 1969 Horace Albright Memorial Lecture, University of California.

His extensive publications include a 1969 book, *Design with Nature*. He is widely known for television appearances on programs concerning man and his environment.

31

Previous Lecturers

1968 Mrs. Lyndon B. Johnson
addressed the American Institute of Architects in Portland, Oregon.

1969 Mr. Patrick Horsbrugh
Professor of Architecture and creator of the Graduate Program in Environic Studies at Notre Dame University
addressed the General Federation of Women's Clubs in Cleveland, Ohio.

1970 Dr. Arie Jan Haagen-Smit
California Institute of Technology, Pasadena
addressed the American Society of Landscape Architects in Williamsburg, Virginia.

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33